

NewLife 25

system upgrade

for

Mac 128K Mac Plus

Mac 512K Mac SE

Mac 512Ke

User guide and
installation manual

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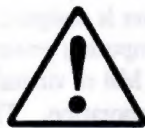
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Before You Start!

**Please read this manual
before you install your NewLife board.**

**It provides important safety procedures
and describes the recommended
installation steps.**

**The following symbols are used in this manual to indicate
important items:**



WARNING!

**A life-threatening situation. Serious injury or death can result
if the hazard is ignored.**



CAUTION!

Static discharge can damage equipment.



NOTE:

**Failure to follow instructions can result in equipment damage
or malfunction.**

part 1 Introduction

The NewLife 25 system upgrade

Congratulations!

We're glad you've chosen to give NewLife™ to your Mac with a NewLife 25 system upgrade. We're sure you'll be pleased with the improved performance and capabilities of your enhanced Mac. With the NewLife 25 you can run applications that require increased processor speed and memory, and you can use fast SCSI hard disks to quickly access large amounts of data.

There are two versions of the NewLife 25. One is designed specifically for the Mac 128K, 512K, 512Ke, and Plus. The other is designed for the Mac SE. NewLife 25 gives your Mac computing power in the class of a Mac IIci and supports up to 16 MB of virtual memory with VIRTUAL™ 3.0 by Connectix Corporation. The NewLife 25 SE accepts up to 16 MB of memory (for which VIRTUAL™ is required), and the NewLife 25 Plus has an optional SCSI port available which enables the Mac 128K, 512K, and 512Ke to use hard disks and other SCSI devices.

NewLife 25 features and benefits

- NewLife 25 is powered by a 25 MHz 68030 CPU and 68882 FPU co-processor pair for lightning fast operation.
- NewLife 25 SE is installed by simply plugging the board into the SE expansion connector
- NewLife 25 Plus is installed using a snap on clip over the Macintosh 68000 CPU. This is a simple, reliable, method of attachment.
- NewLife 25 features a flexible memory expansion structure using SIMM technology. You can install 1MB, 4MB or, in the case of the NewLife 25 SE, 16 MB of RAM.
- NewLife 25 supports up to 16 MB of virtual memory with VIRTUAL™ 3.0 by Connectix Corporation.
- NewLife 25 is fully System 7 compatible.
- NewLife 25 Plus has an optional SCSI port available for Mac 128K, 512K, and 512Ke upgrades.
- NewLife 25 gives you the performance of a Mac IIci to run powerful programs like MacDraw, Illustrator, Freehand, Excel, Wingz, Word, WordPerfect, Quark XPress, and PageMaker.

About memory and VIRTUAL™

The NewLife 25 accepts on board memory in the form of four Single In-Line Memory Modules (SIMM's). All four SIMM sockets on the accelerator must be filled. The NewLife 25 Plus accepts 256K and 1 MB SIMM's, for a maximum board capacity of 4MB. The NewLife 25 SE accepts 256K, 1 MB and 4 MB SIMM's, for a maximum board capacity of 16MB. In order to access more than 4 MB of RAM, VIRTUAL™ 3.0 by Connectix Corporation is required. With 4 MB of RAM installed on the NewLife 25, VIRTUAL™ also allows you to use any unused space on your hard drive as additional application memory, up to 16 MB.

The ROM's of a Compact Macintosh (Plus, SE and Classic) allow the system to address no more than 4 MB of memory. Consequently, RAM on the motherboard cannot be used as application memory. A small portion of this memory is required for the Mac's internal screen video data, but with VIRTUAL™ or the NewLife 25 Support Software, the remaining motherboard memory may be used as a RAM Disk.

If you are installing the NewLife 25 on a Mac Plus or Mac SE, at least 1 MB of memory must be left on the motherboard. If you change your motherboard memory configuration, please ensure that the motherboard RAM configuration jumpers/resistors are changed accordingly.

About this manual



This manual gives you step by step instructions to install, configure and use the NewLife 25 system upgrade.

Some of the steps are potentially life-threatening to you, and hazardous to your Mac. We recommend that you have the installation done by your dealer's qualified service technician.

If you wish to install the NewLife 25 yourself, *read the safety precautions in part 2.*

part 3 of this manual contains the installation steps for the NewLife 25 Plus on a Mac 128K, 512K, 512Kc, and Plus.

part 4 contains the installation steps for the NewLife 25 SE

part 5 describes the installation and configuration of the NewLife 25 Support Software.

part 6 contains technical information and a troubleshooting guide in case you experience difficulties with the installation.

part 2

Preparation and Safety Precautions

Prepare your workplace

Static electricity can severely damage your Macintosh or the NewLife 25 board.



To prevent static damage, take the following precautions:

- Place a grounded antistatic mat on your workbench.
- Wear a conductive wrist strap connected to the mat.

Gather the tools you will need

- CRT discharge tool
- Macintosh case opening tool or equivalent (also known as the pull-apart tool)
- 12-inch T-15 Torx screwdriver or equivalent
- Safety goggles
- Regular flat-blade screwdriver
- Utility knife for the NewLife 25 SCSI port installation
- Soft cloth or foam pad
- Soldering iron (for the NewLife 25 Plus pin kit method of attachment only)

Check the package contents



128K



512K



512Ke



Plus

If you have purchased the **NewLife 25Plus** for the Mac 128K, 512K, 512Ke and Plus, the package should contain:

- NewLife 25Plus board (Mac 128K, 512K, 512Ke, Plus)
- Killy clip with installation sheet
- Pin kit
- Wiring harness
- Fan kit
- 3.5 inch diskette with control software
- User Guide & Installation Manual (this book)



128K



512K



512Ke

If you have purchased the optional **NewLife 25 SCSI port** for the Mac 128K, 512K, and 512Ke, the package should also contain:

- NewLife SCSI port board
- Replacement battery cover loosely attached to the DB-25 SCSI connector with 2 screws
- Internal SCSI cable



SE

If you have purchased the **NewLife 25SE** for the Mac SE, the package should contain:

- NewLife 25SE board (Mac SE)
- 3.5 inch diskette with control software
- User Guide & Installation Manual (this book)

Understand the hazards



WARNING!

Macintosh computers contain high voltages and a high vacuum picture tube. Both can cause serious personal injury and property damage. This equipment should only be installed by a qualified technician.

Serious injury or death may result from improper handling of the interior components of the Macintosh.

DO NOT attempt this installation unless you are completely familiar with the methods for preventing electrical discharge and shock.

Always unplug the Macintosh

Make sure that the Macintosh is disconnected from AC power. Working within the Macintosh computer requires skill and expertise to prevent electrical discharge and shock, even when the Macintosh has been disconnected from its power source.

Discharge the CRT anode



The CRT anode can have extremely high voltages present (12,000 volts). Follow the steps specified in the Macintosh Technical Procedures manual to discharge the CRT anode. For your convenience, we have summarized the basic instructions in Section 3. Consult the original Macintosh documentation for all of the details.

Handle the CRT with care



The CRT contains a high vacuum — if it is cracked or broken, it can violently implode causing serious injury. Handle the CRT with care. Always wear safety glasses when the case is open.

part 3

Installing the NewLife 25 Plus on the Mac 128K, 512K, 512Ke, and Plus

Orienting the NewLife 25 Plus



Figure 1 is a simplified top view of NewLife 25 Plus. It shows the relative locations of the SIMM sockets, the configuration jumpers, the power supply adjustment LED's and the header for the optional SCSI port board.

This diagram does not show all of the components on the board, it is supplied to help you orient the board.

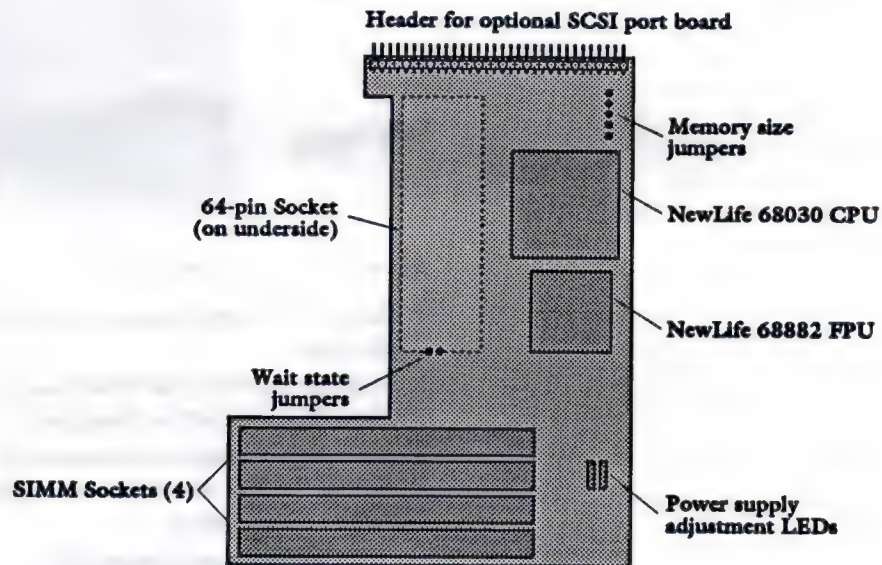


Figure 1 : Simplified top view of NewLife 25Plus

Five easy installation steps

You install the NewLife 25 Plus in five easy steps:

- Step one: Open the Macintosh case; remove the motherboard;
- Step two: Set the NewLife 25 Plus configuration jumpers and install the memory;
- Step three: Attach NewLife 25 Plus to the Macintosh motherboard;
- Step four: Replace the Macintosh motherboard and adjust the power supply, if necessary;
- Step five: Attach the SCSI cable and close up the case.

Step one:

Remove the Macintosh motherboard

To open the Macintosh case:

1. Turn off the power and disconnect the AC power cord from the source and from the back of the computer;
2. Disconnect the mouse and all other external cables from the back of the computer. Disconnect the keyboard;
3. Remove the reset/interrupt switch (if installed) from the side of the case by prying it off with a small flat-blade screwdriver.

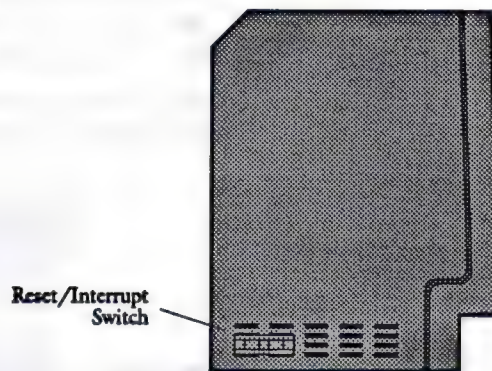


Figure 2 : The reset/interrupt switch

4. Remove the battery compartment cover from the back of the case;
5. To avoid scratching the bezel, place the computer face down on a soft cloth or foam pad;
6. Use a Torx screwdriver to remove the five screws from the back of the Mac. Note that one of the screws is inside the battery compartment.

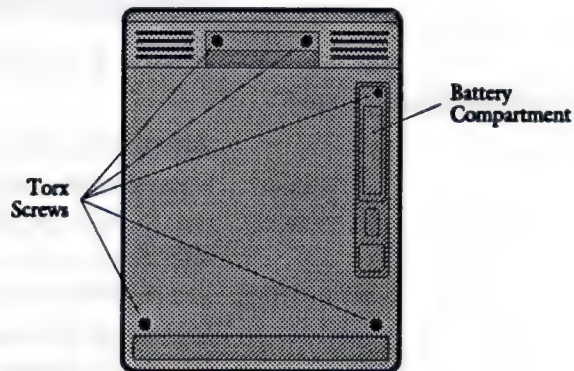


Figure 3 : The back of the Macintosh

7. Use the pull-apart tool to gently pry the cover loose. Carefully lift up the cover and set it aside;
The CRT picture tube is now exposed — be careful!
8. Stand the Macintosh back up in its normal position.

WARNING!



The following procedure is dangerous, a serious shock hazard exists!

To discharge the CRT anode:

1. Remove your grounding wrist strap, if you have it on. Remove any jewelry you are wearing. Put on your safety goggles.
2. Attach the alligator clip of the CRT discharge tool to the metal part of the ground lug exactly as shown in Figure 5; *Do not clip onto the chassis.*
3. Put one hand behind your back or in your pocket. Grasp the insulated handle of the CRT discharge tool with your free hand. Hold the CRT discharge tool against the side of the CRT and insert it under the anode cap, until it touches the anode ring. A crackle or spark may be generated.
4. Remove the CRT discharge tool from under the anode cap. You may wish to repeat step three, to be sure the CRT is discharged.
5. Remove the alligator clip from the ground lug.

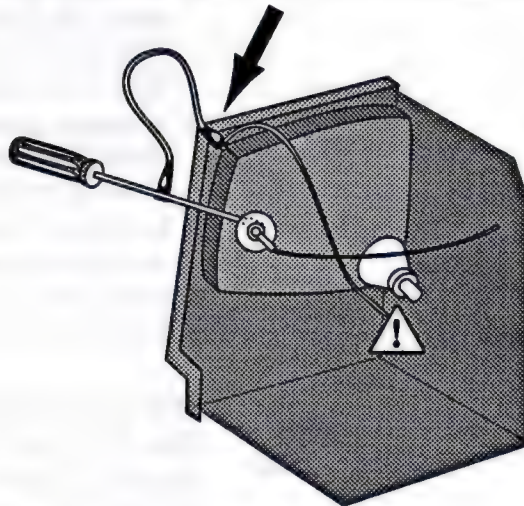


Figure 4: Discharging the CRT anode



To remove the Macintosh motherboard:

1. To prevent static damage to your Mac or NewLife 25, put on your antistatic wrist strap and perform this operation on your antistatic mat.
2. Locate the motherboard. It is on the bottom side of the Mac. You must detach the connectors from the motherboard before it will slide out of the case.

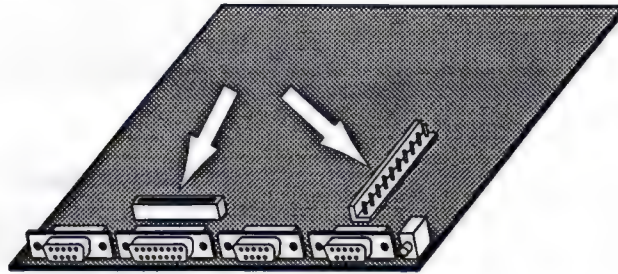


Figure 5 : Motherboard connectors for Mac 128K, 512K and 512Ke

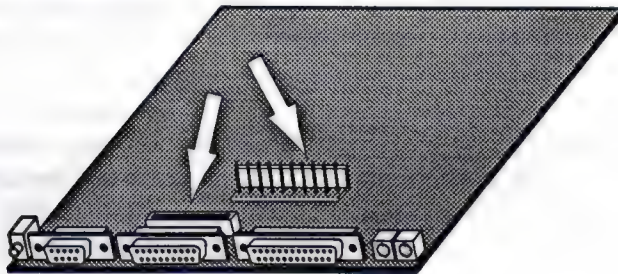


Figure 6 : Motherboard connectors for Mac Plus

3. To unplug the power/video connector, grasp the wire bundle and gently pull it away from the board. Care must be taken as the connection may release suddenly causing your hand to strike the CRT neck, breaking the vacuum seal.
4. To unplug the internal floppy drive connector, grasp the ribbon cable assembly cable and gently pull it out of the socket on the board.
5. Lay the Mac face down (on your foam pad) and slide the motherboard up and out of the case.
6. Put the Mac aside in a safe location, and place the motherboard on your antistatic mat.



If you are adding NewLife to an unenhanced Mac 128K or Mac 512K, you must install an Apple 128KB ROM kit upgrade first. The Mac 512Ke already has the 128KB ROMs installed.

Step two

Install and configure NewLife memory

The NewLife 25 Plus can be configured with 1MB of RAM using four 256KB SIMMs or with 4MB of RAM using four 1MB SIMMs. (Although the NewLife 25 can be configured with 0MB of RAM, it is not recommended. The 16-bit data bus in the Mac motherboard provides much poorer performance than the 32-bit data bus on NewLife 25.) You must set two groups of jumpers to configure NewLife:

- the wait state jumper
- the memory size jumper block

The settings used for these jumpers depends on the amount and type of memory you install on the accelerator.

The NewLife 25 is built to accommodate four SIMM's. You must use low-profile or surface-mount SIMMs which are rated at the following speed:

- for 1 wait state: 70ns or faster
- for 2 wait states: 110ns or faster

To install the memory:

1. Place the NewLife board on your antistatic mat.
2. Set the wait state jumper to correspond to the type of memory you are installing as shown in Figure 7.
3. Set the memory size jumper to correspond to the amount of memory you are installing as shown in Figure 8.
4. Install the SIMMs. Because the SIMM sockets are slanted, you must fill them starting at the center of the board, working towards the outer edge.

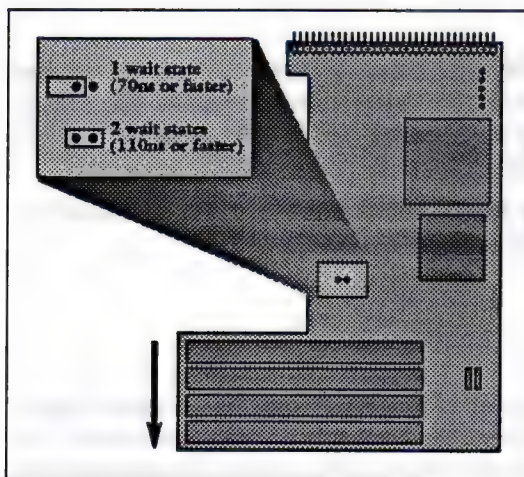


Figure 7: The wait state jumper

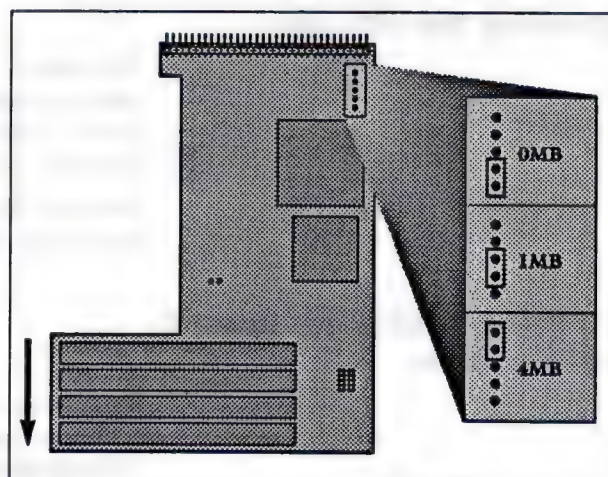


Figure 8: The memory size jumpers

Step three

Attaching to the Macintosh motherboard

You install the NewLife 25 Plus accelerator board on top of the Macintosh motherboard — as shown in Figure 9. The 64-pin connector on the bottom of the NewLife 25 Plus board attaches to the Macintosh 68000 CPU. This is done in one of two ways:

1. with a “Killy clip”
2. with soldered pin mounts (required for a ceramic 68000 CPU)

A ceramic 68000 has a gray or light brown case.

A plastic 68000 has a black case.

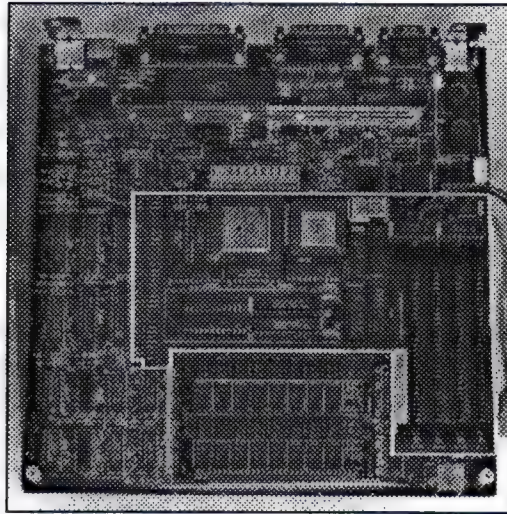


Figure 9 : Positioning the NewLife 25Plus on the Mac motherboard

Installing the Killy clip



To install the Killy clip, follow the instructions on the separate sheet enclosed with the NewLife documentation. *You cannot use the Killy clip on a ceramic 68000 CPU. A ceramic 68000 has a gray or light brown case.*

Once the Killy clip is installed you connect the NewLife board to the pins on top of the clip.

Installing soldered pin mounts, *an alternative*

Some early versions of the Macintosh have ceramic 68000 CPUs. A ceramic 68000 has a gray or light brown case. *The Killy clip does not work with ceramic 68000s.* You must use the soldered pin mount technique.

DO NOT attempt this procedure unless you are familiar with correct soldering techniques for multilayer boards. Good soldering skills and equipment are required to successfully complete this procedure.

To install the pin mounts:

1. In the first instance, you must clean with alcohol the leads of the 68000 CPU before soldering or installing the Killy clip.
2. You must solder header strips onto the pins of the Macintosh CPU. Two 32-pin header strips are supplied, mounted under a 64-pin socket as shown in Figure 10. The 64-pin socket is only used as a carrier for the header strips to simplify the soldering procedure — once you are done, discard the socket.

3. Straddle the header strips and socket assembly over the Macintosh 68000 CPU.

The header strip pins must each slide about halfway down the side of one of the 68000s pins. The socket pins must be pointing upwards — away from the board.

4. Carefully solder each of the header strip pins to the Macintosh 68000 CPU. *Remove any flux residue and check for bad solder joints or solder bridges. Poor soldering can prevent proper operation of the Macintosh — it may not even boot up.*
5. Remove and discard the 64-pin socket. The two header strips are now attached to the 68000 with their pins pointing upwards. You will connect the NewLife board to these pins.

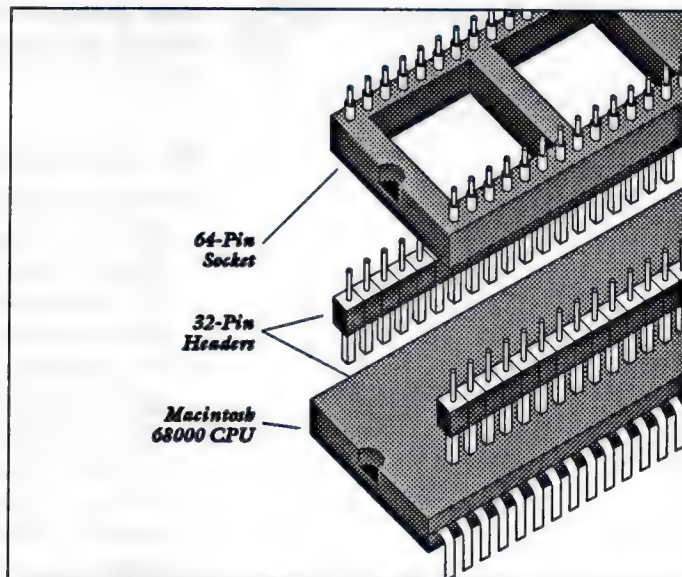


Figure 10 : Exploded view of the pin mount

Attaching the NewLife board

The 64-pin socket on the bottom of the NewLife board connects to the pins on the Killy clip — or to the header strip pins if you used the soldered pin mount procedure.

Position the NewLife board above the Macintosh motherboard as shown in Figure 9. *Before you apply any pressure, look between the two boards and make sure all of the pins are aligned with the socket.*

CAUTION:



Align all of the pins with their correct socket positions before applying pressure. If the pins and socket are misaligned you can severely damage the board and pins and void your NewLife warranty.

Place the entire assembly on your antistatic mat and apply pressure to the NewLife board — but only above the socket location. After the pins are seated in the socket, inspect the assembly to make sure the NewLife board is completely seated and properly aligned.

Step four Replacing the motherboard in the Macintosh



When you removed the motherboard, you slid it out of the metal guides towards the back of the Macintosh. *With the NewLife board attached, the assembly is too high to slide back into the Macintosh.*

To replace the motherboard:

1. Place one edge of the motherboard in the metal guides with the keyboard connector toward the front of the computer about half an inch behind the plastic front cover. Feed the accelerator power cable up through the large hole in the center of the chassis frame.
2. Use a flat tool — such as a small screwdriver — to carefully spread the metal guide frame away from the opposite edge of the motherboard. Push the motherboard into position and release the metal guide frame. Push the motherboard down to seat the rear metal brackets. The motherboard should be held securely by the guides.
3. Carefully re-attach the internal floppy drive ribbon cable and ensure that it is properly seated at both ends.

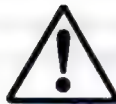
4. Unplug and completely remove the original Macintosh power/video wiring harness from the video board (the vertical board at the side of the Mac).
5. Install the NewLife power/video harness by plugging it into the Mac's power supply board, the motherboard and the accelerator board. The end of the NewLife harness with the ferrite bead should be oriented towards the motherboard. Note that the plug which mates with the accelerator's (+5V) comes off of the motherboard end of the harness and contains female terminals, while the plug which mates with the fan's (+12V) comes off of the analog board end and has male terminals.

Adjust the power supply, if necessary

The Macintosh has an adjustable power supply designed to operate between 4.9 and 5.0 volts. There are two LEDs on NewLife 25 Plus that make power supply adjustment fast and easy.



Figure 11 : Power supply adjustment LEDs



WARNING!

The following steps are dangerous,
a serious shock hazard exists!

To check and adjust the power supply:

1. Noting the warning above, remove your grounding wrist strap and reconnect the AC power cord to the Macintosh.
Keep your hands away from the machine!
2. Turn on the power and wait a moment for the voltage to settle. Observe the red and yellow power supply adjustment LEDs. If neither one is illuminated, no

adjustment is necessary.

3. If adjustment is required, turn the voltage set screw on the side of the power supply until both LEDs go out. The set screw is clearly labelled on the plastic power supply shield.
4. If a more accurate measurement is desired, use a high quality digital voltmeter to measure the voltage between pin 6 of the harness's ten-prong plug (*positive supply*) and the chassis (*ground*). Insert one of the voltmeter's probes into the top of the connector before turning on the power. The voltage should be adjusted to somewhere between 4.9 and 5.0 volts.

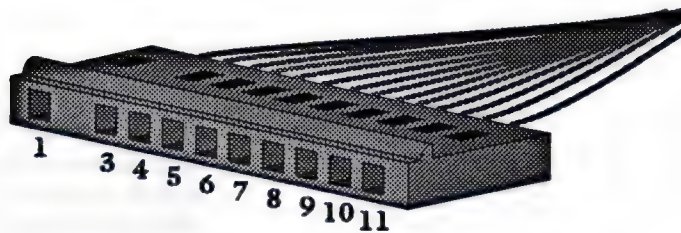


Figure 12 : Power supply plug



5. Turn off the power and disconnect the AC power cord.
Hazardous voltages may still be present even after disconnecting the AC power!

Install the fan assembly

The fan assembly is installed behind the internal disk drive attached to the metal chassis at the back of the Mac.

1. Attach the fan to the bracket with two bolts and nuts. The arrow on the fan showing the direction of air flow, should be pointing up.
2. Mount the bracket on the chassis with two bolts, washers and nuts, on the side and at the back.
3. If you have not purchased the optional SCSI port, the installation is complete — you can close up the Mac case. If you did purchase the SCSI port, install it as described on the next page before you close up the case.

Step five

Install the SCSI port (optional)

Attach the optional SCSI port board to the 64-pin header on the NewLife 25Plus. The SCSI cable and connector assembly is shipped loosely attached to the battery door connector.

The cable is designed to run out of the Macintosh battery door. You must remove a small part of the plastic ridge on the battery compartment housing to make room for the cable. Use a sharp utility knife to trim away 1.25 inches of the ridge as shown in Figure 13. Make sure to remove any rough edges that could damage the cable.



Figure 13 :
Remove 1.25 inches of the battery compartment ridge

Place the 25-pin D connector on top of the battery, laying the cable towards the trimmed edge of the battery compartment. Attach the rectangular black connector on the end of the SCSI ribbon cable to the header of the NewLife SCSI board. The cable connector is keyed to prevent improper installation. You can now close up the Mac case.

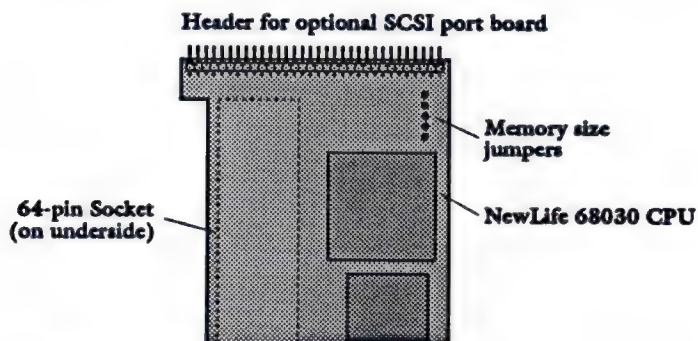


Figure 14 : The SCSI port board header

SCSI configuration

The SCSI port provides optimum performance with SCSI hard disk drives when the hard disk driver is configured in Full Handshake Mode. Your hard disk driver software may allow you to set this option — refer to your hard disk user manual. You can also use a SCSI manager application program such as Silverlining to set this mode.

CAUTION:

Do not configure for Blind Transfer Mode. This mode gives very poor hard disk performance, or no hard disk response at all.

The last device in the SCSI chain should be equipped with termination resistors. If the terminators are missing, SCSI peripheral behaviour may be unpredictable, or the system may not recognize the peripheral.

There should be only one set of termination resistors in the SCSI chain. More than one set may cause problems. If SCSI problems arise in your system, carefully check for terminating resistors. Refer to the user guides for each SCSI device to determine if the resistors are installed.



Please note that the NewLife SCSI port, like that of a Mac Plus motherboard, does not provide the +5 volts termination power. Those hard drives which do not provide this internally will not work with the NewLife SCSI port, nor will they work with the Mac Plus SCSI port.

part 4

Installing NewLife 25SE on the Mac SE

Orienting the NewLife 25SE for the Mac SE

Figure 15 is a simplified top view of the NewLife 25 SE for the Mac SE. It shows the relative locations of the SIMM sockets, the configuration jumpers, and the SE expansion connector for the SE bus.

This diagram does not show all of the components on the board — it is supplied to help you orient the board.

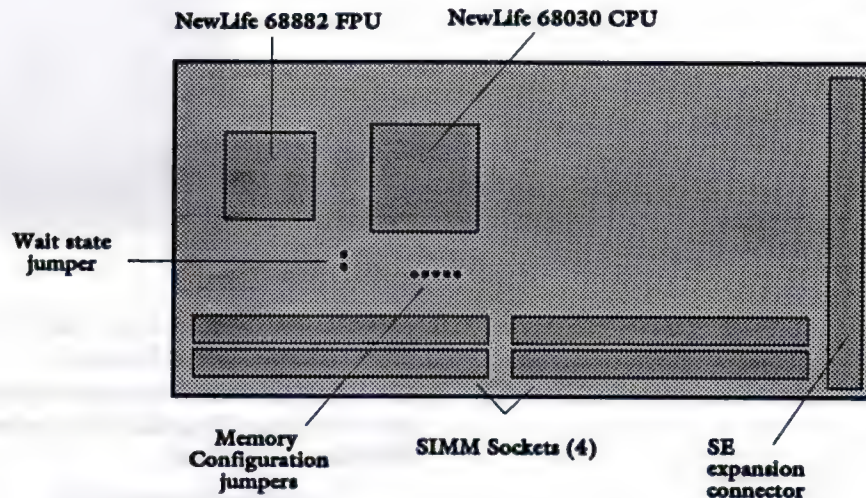


Figure 15 : Simplified top view of NewLife 25 for the SE

Four easy installation steps

You install the NewLife 25SE in four easy steps:

- Step one: Remove the Macintosh motherboard.
- Step two: Set the NewLife 25SE configuration jumpers and install the memory;
- Step three: Attach the NewLife 25SE to the Macintosh motherboard;
- Step four: Replace the Macintosh motherboard and close up the case.

Step one: Remove the Macintosh motherboard

To open the Macintosh SE case:

1. Turn off the power and disconnect the AC power cord from the source and from the back of the computer.
2. Disconnect the mouse and all other external cables from the back of the computer. Disconnect the keyboard.
3. Remove the reset/interrupt switch (if installed) from the side of the case by prying it off with a small flat-blade screwdriver.

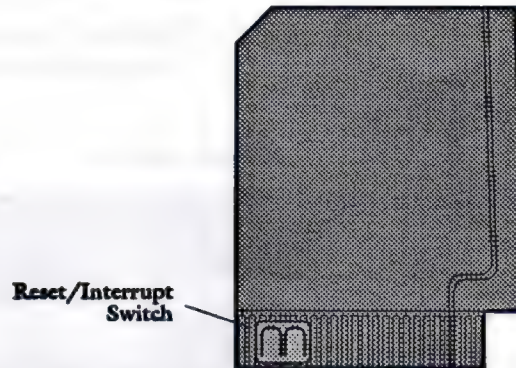


Figure 16 : The reset/interrupt switch

4. To avoid scratching the bezel, place the computer face down on a soft cloth or foam pad.
5. Use a Torx screwdriver to remove the four screws from the back of the Mac. Note that the upper screws are silver and the lower ones are black.

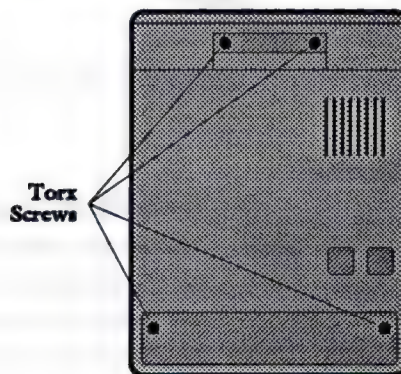


Figure 17 : The back of the Macintosh SE

6. Use the pull-apart tool to gently pry the cover loose. Carefully lift up the cover and set it aside. *The CRT picture tube is now exposed — be careful!*
7. Stand the Macintosh back up in its normal position.

WARNING!



The following procedure is dangerous, a serious shock hazard exists!

To discharge the CRT anode:

1. Remove your grounding wrist strap, if you have it on. Remove any jewelry you are wearing. Put on your safety goggles.
2. Attach the alligator clip of the CRT discharge tool to the metal part of the ground lug exactly as shown in Figure 19. *Do not clip onto the chassis.*
3. Put one hand behind your back or in your pocket. Grasp the insulated handle of the CRT discharge tool with your free hand. Hold the CRT discharge tool against the side of the CRT and insert it under the anode cap, until it touches the anode ring. A crackle or spark may be generated.
4. Remove the CRT discharge tool from under the anode cap. You may wish to repeat step three, to be sure the CRT is discharged.
5. Remove the alligator clip from the ground lug.

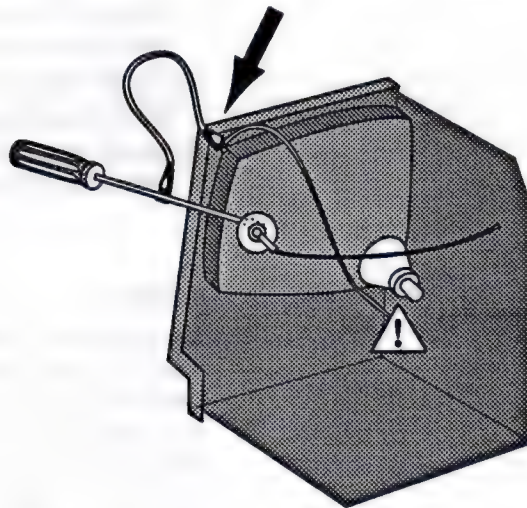


Figure 18 : Discharging the CRT anode



To remove the Macintosh motherboard:

1. *To prevent static damage to your Mac or NewLife 25SE, put on your antistatic wrist strap and perform this operation on your antistatic mat.*
2. Locate the motherboard. It is on the bottom side of the Mac. You must detach the connectors from the motherboard before it will slide out of the case.

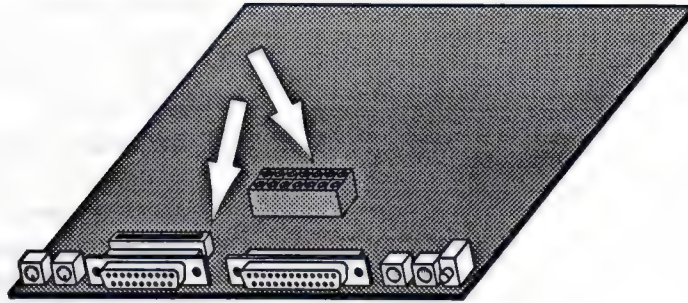


Figure 19: Motherboard connectors for Mac SE

3. To unplug the power/video connector, grasp the wire bundle and gently pull it away from the board. Care must be taken as the connection may release suddenly causing your hand to strike the CRT neck, breaking the vacuum seal.
4. To unplug the internal floppy drive connector, grasp the ribbon cable assembly cable and gently pull it out of the socket on the board.
5. Lay the Mac face down (on your foam pad) and slide the motherboard up and out of the case.
6. Put the Mac aside in a safe location, and place the motherboard on your antistatic mat.

Step two

Install and configure NewLife memory

The NewLife 25 SE can be configured with 1, 4 or 16 MB of RAM. All four SIMM sockets must be filled. (Although the NewLife 25 can be configured with 0MB of RAM, it is not recommended. The 16-bit data bus in the Mac motherboard provides much poorer performance than the 32-bit data bus on NewLife 25.) You must set two groups of jumpers to configure NewLife:

- the wait state jumper
- the memory size jumper block

The settings used for these jumpers depends on the amount and type of memory you install.

NewLife 25 is built to accommodate four SIMMs for memory upgrades. You must use low-profile or surface-mount SIMMs which are rated at the following speed:

- for 1 wait state 70ns or faster
- for 2 wait states 110ns or faster

To install the memory:

1. Place the NewLife board on your antistatic mat.
2. Set the wait state jumper to correspond to the type of memory you are installing as shown in figure 21.

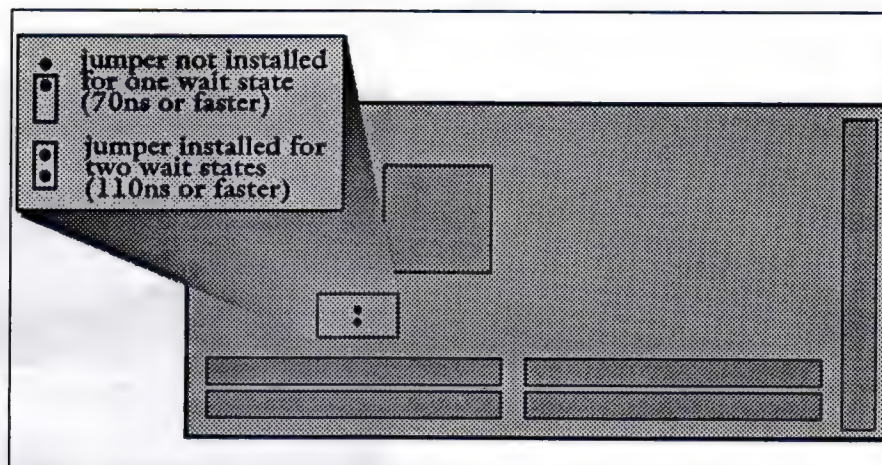


Figure 20 : The wait state jumper

3. Set the memory size jumper to correspond to the amount of memory you are installing as shown in figure 22.

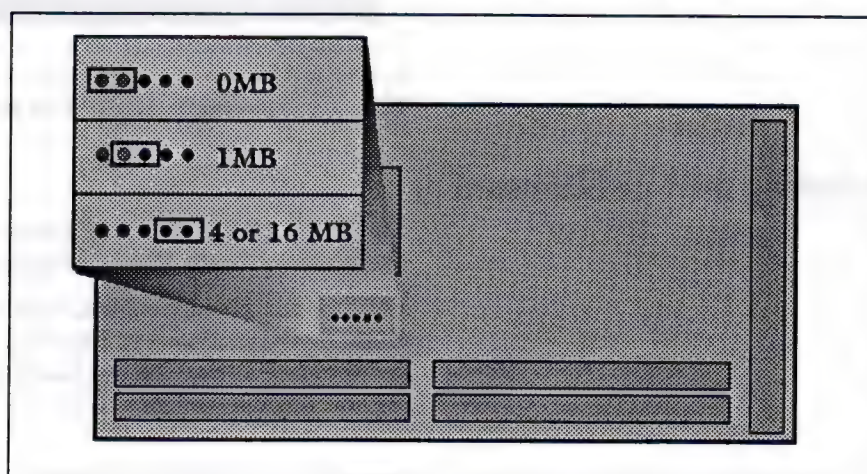


Figure 21 : The memory size jumpers

4. Install the SIMM's. Because the SIMM sockets are slanted, you must fill them starting at the center of the board, working towards the outer edge.

Step three Attaching to the Macintosh motherboard

You install the NewLife 25SE board on top of the Macintosh motherboard — as shown in Figure 22. The 96-pin connector on the bottom of the NewLife board attaches to the Mac SE expansion connector.

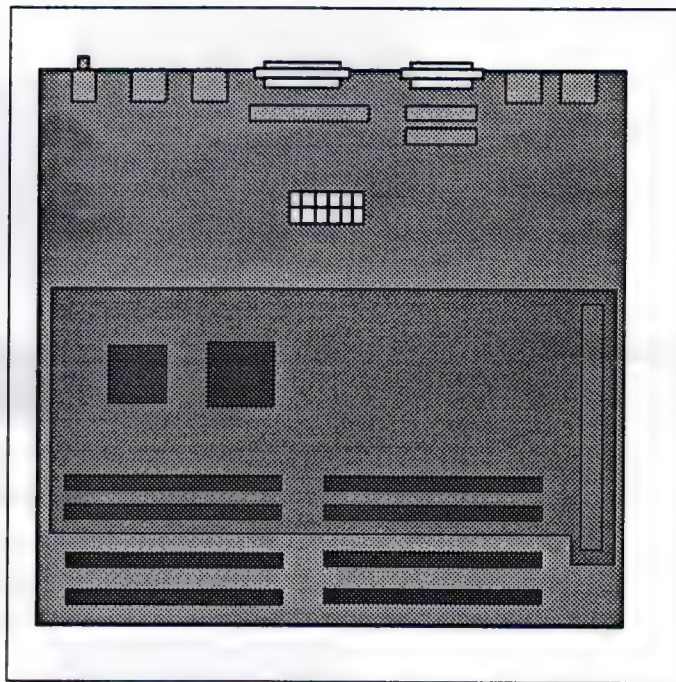


Figure 22: Positioning the NewLife 25SE on the Mac motherboard

Attaching the NewLife board

The 96-pin connector on the bottom of the NewLife 25SE board attaches to the Mac SE expansion connector.

Position the NewLife 25SE board above the Macintosh motherboard as shown in Figure 22. *Before you apply any pressure, look between the two boards and make sure all of the pins are aligned with the socket.*



Place the entire assembly on your antistatic mat and apply pressure to the NewLife 25SE — *but only above the socket location*. After the pins are seated in the socket, inspect the assembly to make sure the NewLife 25SE board is completely seated and properly aligned.

CAUTION:

Align all of the pins with their correct socket positions before applying pressure. If the pins and socket are misaligned you can severely damage the board and pins and void your NewLife warranty.



Step four Replacing the motherboard in the Macintosh

When you removed the motherboard, you slid it out of the metal guides towards the back of the Macintosh. *With the NewLife board attached, the assembly is too high to slide back into the Macintosh.*



To replace the motherboard:

1. Place one edge of the motherboard in the metal guides with the keyboard connector toward the front of the computer about half an inch behind the plastic front cover.
2. Use a flat tool — such as a small screwdriver — to carefully spread the metal guide frame away from the opposite edge of the motherboard. Push the mother board into position and release the metal guide frame. The motherboard should be held securely by the guides.
3. Re-attach the internal floppy drive ribbon cable and the power/video cable. The cable connector is keyed to prevent improper installation.
4. Close up the Mac case.

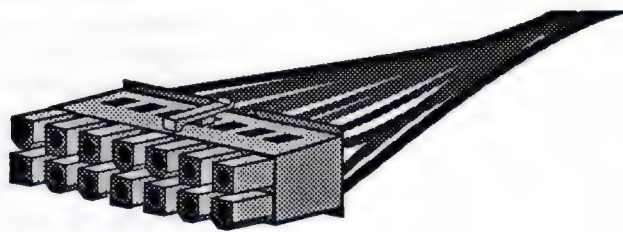


Figure 23 : Power supply plug

part 5

Software Configuration

Booting in 68000 mode

Normally the Mac will boot up using the 68030 microprocessor. If you have a programmer's switch installed on your Mac, you can force the Mac to boot up using its original 68000 microprocessor. This temporarily disables NewLife 25 and renders any additional memory unusable.

To temporarily disable NewLife 25:

1. Turn on the Mac and simultaneously press the **RESET** button (the one closest to the front of the computer) and **INTERRUPT** button on the programmer's switch.
2. Continue to hold the **INTERRUPT** button down, but release the **RESET** button.
3. When you hear the familiar Mac startup chime, release the **INTERRUPT** button. The Mac is now running in native 68000 mode.

To re-enable NewLife 25:

1. Simply restart by pressing the **RESET** button, turning the power off and on, or selecting the Shutdown or Restart option from the Special menu in the Finder.

NOTE:

If you have a Mac SE with an Apple Super Drive (FDHD), you cannot write to PC DOS diskettes when the NewLife 25 is enabled. Switch to native 68000 mode as described above if you need to write to a PC DOS diskette.

Installing the Support Software

The support software consists of three files that are used to control the various features of the NewLife 25 system upgrade. On the support software disk is a control panel device called **NewLife 25 Cdev**. This gives the user control of the features installed by the **NewLife 25 Init**. With this cdev you can easily turn on and off the various features of the NewLife 25 as well as specify whether or not you want those features automatically invoked each time you reboot your computer. An additional extension called **Patch 701** must be installed in your extensions folder if you are using System 7.01 and the System 7 TuneUp.

To install the NewLife 25 Support Software on a Macintosh with System 6:

1. Remove any previous versions of the NewLife 25 Support Software from your startup disk.
2. Copy the files named 'NewLife 25 Init' and 'NewLife 25 Cdev' from the 'Install' folder on the NewLife disk into the System Folder on your startup disk.
3. If you are using a Mac Plus or 512Ke, you must also copy the AppleTalk file (version 51) from the 'Additional File for System 6' folder into your System Folder.
4. Restart your Macintosh.

To install the NewLife 25 Support Software on a Macintosh with System 7:

1. Remove any previous versions of the NewLife 25 Support Software from your startup disk.
2. Copy the file named 'NewLife 25 Init' from the 'Install' folder on the NewLife disk into the Extensions folder in the System Folder on your startup disk.
3. Copy the file named 'NewLife 25 Cdev' from the 'Install' folder on the NewLife disk into the Control Panels folder in the System Folder on your startup disk.
4. If you are using System 7.01 and the System 7 TuneUp then copy the file named 'Patch 701' from the 'Additional File for System 7' folder into the Extensions folder in the System Folder on your startup disk.
5. Restart your Macintosh.

To examine or change any of the NewLife 25 Support Software features:

1. Enter the control panel and open the NewLife 25 cdev.
2. Use pages 28-29 in the manual as a guide to set the support software options. If in doubt, do not change the settings. In most cases the default settings are optimal.

Using the Control Software

Figure 24 shows the NewLife 25 Cdev dialog box. In the left column is a list of features you can turn on and off with the Control application. A description of each feature appears below.

NewLife25 Cdev	
NewLife Computer Corp. 603 March Road, Kanata, Ontario, Canada, K2K 2M5 (613) 592-5080 Version 5.35	
Accelerator Options	Current..Boot
MC68030 Data Cache	<input type="checkbox"/> .. <input type="checkbox"/>
MC68030 Sound Driver	<input checked="" type="checkbox"/> .. <input checked="" type="checkbox"/>
SANE Traps Directed To MC68882	<input checked="" type="checkbox"/> .. <input checked="" type="checkbox"/>
Copy ROM to 32 Bit RAM	<input type="checkbox"/> .. <input type="checkbox"/>
Crash Resistant RAM Disk	<input checked="" type="checkbox"/> .. <input checked="" type="checkbox"/>
Memory Setup	Processor Setup
On board: 4096 k	CPU: MC68030RC25
Logic board: 2560 k	FPU: MC68882
Protected: 2495 k	
Video buffers: 64 k	

Figure 24: Control dialog box

The column labelled "Current" displays the current state of each feature, while the column labelled "Boot" indicates the state desired after the next reboot. The term "desired" is used here because it may not be possible to set the requested state. If a requested feature is not available, it is ignored during the boot phase. (Please note that the address shown in the displayed dialog box is incorrect. Please refer to the front of this manual for our address.)

To alter the current state of a feature, click the appropriate radio button in the "Current" column. If a button is greyed out, you cannot change the current state of that feature. However, if you click a button in the "Boot" column, the feature state you select will take effect when the Macintosh is rebooted.

When you close the control panel your selections are saved to your startup disk. Once you reboot the "Boot" column features are enabled.

Description of software features

MC68030 Data Cache

The 68030 microprocessor has internal instruction and data caches. When the internal caches are turned on, the 68030 microprocessor stores recently used instructions and data in them. To save time, the 68030 will fetch cached items rather than using main memory.

To save time and increase performance turn on the data cache. There are a few applications written with self modifying code that will not run properly with instruction and data caches turned on. Turn this feature off for any such application.

MC68030 sound driver

NewLife 25 runs too quickly for four voice sound with Apple's standard sound driver. If you turn on the MC68030 sound driver, programs that use the Apple 128K ROM sound driver for multi-voice sounds and music will operate properly. Programs that don't use the ROM sound driver can not take advantage of this feature.

SANE traps to MC68882

SANE (Standard Apple Numeric Environment) is a floating point math software package that is included in the ROM or system file of every Macintosh. Many applications use SANE to perform floating point math. When SANE traps to 68882 is turned on, calls to SANE are directed to the 68882 floating-point math coprocessor. This results in much faster floating point operations.

Copy ROM to 32-bit RAM

The 68030 microprocessor accesses memory 32 bits at a time. NewLife 25 can access both the Macintosh motherboard 16-bit memory (ROM and RAM) as well as any 32-bit memory installed on the NewLife 25 board. When Copy ROM to 32-bit RAM is turned on, the Macintosh ROM's are copied into the 32-bit RAM on board the NewLife 25. This allows almost all memory accesses (RAM and ROM) to use NewLife 25's 32-bit high speed RAM, increasing the overall performance.

Crash resistant RAM disk

When this feature is turned on, NewLife 25 creates a crash resistant RAM disk in the 16-bit motherboard memory. The RAM disk uses all of the motherboard memory available to it. While much slower than the 32-bit high speed memory onboard NewLife 25, the 16-bit RAM is still much faster than a floppy or hard disk.

NewLife 25 automatically protects the motherboard memory from the operating system. As long as the power is not turned off, the contents of the RAM disk should remain in memory. To make sure the RAM disk survives, reboot using the programmer's switch or the Restart menu item. **DO NOT** reboot by turning the Mac off and on.

68030 AppleTalk driver

NewLife 25 runs too quickly for standard AppleTalk. Turn on the 68030 AppleTalk Driver to correct the problem.

Other Notes

Once the NewLife 25 Support Software has been properly installed, the NewLife INIT should load during startup and the icon shown in Figure 25 should appear at the bottom of the screen during startup. If this icon does not appear as shown, then one of the following problems may exist:

- 1) The software is not correctly installed.
- 2) The NewLife 25 has been improperly installed.
- 3) The NewLife 25 is damaged.



Figure 25 : NewLife 25 INIT icon

If you are using Pyro™ with a NewLife™ 25+ you must rename Pyro™ in your system folder so that it is loaded first. This is accomplished by putting several spaces in front of the name Pyro™. Note: the Mac will not let you just put a space in front, you must fool it by putting a character and then the spaces (ie ! Pyro™). Now you can erase the first character (in this case the !). When you select VIEW BY NAME in the desktop, Pyro™ should appear before the NewLife 25 INIT.

part 6

Technical Information

Troubleshooting

The NewLife 25 is a complex piece of electronic hardware; it has been manufactured with great skill and care. In the event that you encounter a problem, follow these steps:

1. *Note that some INITs can conflict with application programs and produce intermittent system failures.* Verify that this type of software conflict is not the problem before you open up the Mac to check the hardware connections inside.
2. Scan the symptoms described in the Troubleshooting Guide (on the following pages) to identify the problem.
3. Follow the steps in the Troubleshooting Guide to remedy the problem and then test your system. *If the remedy requires you to open the Mac case, observe the safety precautions described in part 2 of this manual.*
4. If you are still experiencing problems, or if the instructions in the Troubleshooting Guide tell you to do so, contact your dealer or the NewLife Computer Corporation technical support group for assistance.

For technical support call:

1 (800)663-6395
Monday to Friday,
from 09:00 to 5:00 Eastern Time
Fax: (613) 592-9738

Before you call:

Please have the following information available to allow us to provide you with the best possible service if you call or address an enquiry to our office:

- name, address and phone number
- product (NewLife 25 Plus or NewLife 25 SE) and serial number
- date and place of purchase
- version of NewLife Support Software
- amount and speed of memory installed on accelerator
- the system version which you are using and the version numbers of any other INIT's which you are using
- a detailed description of the nature of your problem

Troubleshooting Guide

Symptom

On power up, nothing happens or screen is blank

Possible Problem and Suggested Remedy

- **No power.** Plug computer into a live outlet and turn it on.
- **Defective Mac.** Remove NewLife board, reassemble Mac and restart. If Mac does not restart properly, it is defective – contact your Mac dealer or repair center.

Symptom

Checkerboard pattern or vertical lines observed on powerup

Possible Problem and Suggested Remedy

- **Bent pin.** Remove board and check for bent pins. Straighten bent pins and carefully reseal socket.
- **Cold solder joint on pin mount.** Remove board and check each pin with an ohmmeter to verify continuity. If a discontinuity is found, carefully resolder the offending pin.

Symptom

Wavering vertical lines observed after powerup

Possible Problem and Suggested Remedy

- **Power supply is not properly connected.** Verify that power supply harness connectors are firmly seated.
- **Power supply is not adjusted to correct voltage** (LEDs are on or flickering). This does not apply to Mac SE models. Re-adjust power supply output voltage following instructions in Part 3.

Troubleshooting Guide

Symptom Sad Mac on powerup

Possible Problem and Suggested Remedy



- **Incorrect SIMM jumper placement on NewLife board.** Verify that memory size jumpers and wait state jumpers have been correctly set for your memory configuration (see Part 3 or 4).
- **Incorrect SIMM jumper/resistor configuration on motherboard.** If you change your motherboard memory configuration when installing the NewLife 25, please ensure that the motherboard RAM configuration jumpers or resistors are configured accordingly.
- **Defective SIMM module(s).** Check the two items above. If Sad Mac still appears on powerup, one or more of the SIMM's may be defective. This can easily be tested by temporarily removing the SIMM's from the accelerator and configuring it for 0 MB.

Symptom Intermittent Sad Mac or system bomb during operation

Possible Problem and Suggested Remedy

- **System software degradation.** Boot up your Mac from the NewLife 25 Support Software disk to verify that it isn't simply a problem the system on your hard drive which is causing the problems.
- **See INIT warning at the beginning of this section.**
- **Intermittent connection between NewLife 25 and Mac CPU.** See remedies under 'Checkerboard pattern' symptom.
- **Intermittent power connection.** Reseat power supply harness connectors.
- **Power supply is not adjusted to correct voltage.** See remedies under 'Wavering vertical lines' symptom.
- **Incorrect wait state jumper placement.** Verify wait state jumper settings (see Part 3 or 4).

Troubleshooting Guide

Symptom

SCSI peripheral is not recognized or does not mount

Possible Problem and Suggested Remedy

- **Peripheral software is incorrectly loaded or configured.** Reload or reconfigure.
- **SCSI address on peripheral is incorrect.** Refer to peripheral user manual for correct SCSI address.
- **Improper SCSI chain termination.** Check for missing terminating resistors on the last SCSI device in the chain. A set of terminating resistors should be installed on the last device in the chain.
- **No termination power.** Ensure that the hard drive provides the +5 volts termination power. The NewLife 25 Plus, like a Mac Plus, does not provide this.
- **Bad connection in SCSI cable between Mac and peripheral.** Replace SCSI cable.
- **Bad connection on internal SCSI cable between NewLife board and battery door connector.** Disconnect and reseat cable to ensure a solid connection at each end. If problem persists, contact technical support for assistance.

Symptom

Hard disk does not work or seems very slow

Possible Problem and Suggested Remedy

- **Wrong mode.** Ensure that disk drive software has been configured for Full Handshake Mode by the disk driver or by a SCSI manager application such as Silverlining. Note that SCSI hard drives must not be configured for Blind Transfer mode.
- **Improper SCSI chain termination.** Check for missing terminating resistors on the last SCSI device in the chain. A set of terminating resistors should be installed on the last device in the chain.
- **Too many terminating resistors.** Remove any terminating resistors on SCSI devices which are not at the end of the SCSI chain. Only the final device in the chain should be equipped with termination resistors. If problem persists, contact technical support for assistance.

NewLife

NewLife 25 Technical Specifications

System Requirements

- Mac 128K, Mac 512K, Mac 512Ke, Mac Plus or Mac SE
- Mac 128K and 512K require 128KB ROM set (available with 800KB floppy disk drive kit)
- 800KB floppy disk drive recommended

Hardware

- CMOS 68030 CPU, 25.175 MHz
- CMOS 68882 numeric co-processor, 25.175 MHz
- 64-pin expansion connector

Wait states

- 1 or 2 selectable, depending on speed of SIMMs

Power

- Mac internal power supply
- Voltage Required: 5 V \pm 10%
- Power Consumption (Mac 128K, 512K, 512Ke, Plus): Max 9.1 Watts with four 1MB SIMMs
- Power Consumption (Mac SE): Max 8.0 Watts with four 1MB SIMMs

Optional SCSI port (Mac 128K, 512K and 512Ke only)

- High speed CMOS SCSI Controller
- Attaches to 64-pin expansion connector on NewLife 25 board

Software controls

- CDEV to select processor options

Environmental

- Operating temperature: 10° to 40°C, 50° to 104°F
- Storage temperature: -40° to 50°C, -40° to 122°F
- Humidity: 5% to 90% RH non-condensing

Compatibility

Compatible with SCSI peripherals, LaserWriter, AppleTalk and with standard Macintosh software. For supplementary information, contact your dealer or NewLife Computer Corporation technical support group.

The NewLife product family

Whether you need a SCSI port, more memory, a larger monitor or massive computing power, NewLife has a product for your Mac. Brief descriptions of the NewLife products are provided below. If you require more information, please see your local dealer or contact us directly.

NewLife 1

Designed for the 128K, 512K and 512Ke Macs, NewLife 1 provides a SCSI port, a flexible memory upgrade to 4MB using 256KB or 1MB SIMMs (or both) with the overall performance of a Mac SE.

NewLife Accelerator!

The NewLife *Accelerator!*, built around our custom ASIC, 68030 CPU and optional 68882 FPU, gives your old Mac 128K, 512K, 512Ke, Plus, SE or Classic speed and power in the Mac II class for a fraction of the cost. It supports memory expansion to 4 MB or, with VIRTUAL™ by Connectix, 16 MB. The NewLife *Accelerator!* for the 128K through Mac Plus offers an on board high-speed SCSI port, and all NewLife *Accelerator!*'s offer an optional on board video adaptor which supports external monochrome monitors.

NewLife 33

Designed for the Mac SE, NewLife 33 is the upgrade for those who need the ultimate in computing power. This board features a 68030 CPU and a 68882 FPU running at a blazingly fast 33 MHz. Four SIMM sockets allow up to 4MB of memory expansion. NewLife 33 is easy to install, it attaches directly to the SE bus connector.

NewLife Video

NewLife Video for the Mac SE provides a flexible, low-cost solution that allows you to add a larger monitor to your SE system. NewLife Video incorporates a custom video controller ASIC. It can use many of the inexpensive third party monochrome monitors available today, including multiscanning monitors. NewLife Video connects directly to the SE bus and comes complete with software that lets you configure the monitor and screen attributes.